

IN THE CLAIMS

Claim 1 (currently amended). A process for the ~~treatment~~ simultaneous desulfurization and denitrification of dust- and oxygen-containing exhaust gases, which contain sulfur oxides and nitrogen oxides, at temperatures in the range from 200°C to 500°C by means of reducing agents, without formation of ammonium sulfate or ammonium hydrogen sulfate and wherein NO_x is decomposed to obtain N₂ and H₂O and SO_x is converted to a sulfate in a reactor which is equipped with solid catalyst with flow passages, in which the free opening surface of the catalyst is more than 50 % and in which the passages of the catalyst have a hydraulic diameter of more than 2 mm, wherein

- a) the treatment in the reactor is performed in the presence of and/or with the addition of ammonia or ammonia-releasing compounds, in amounts which result in an approximately stoichiometric NH₃/NO_x ratio, and one or more substances selected from the group consisting of free oxides, carbonates, hydroxides of calcium, magnesium, sodium and potassium, said substances being present in or added to said exhaust gases prior to contact of said exhaust gases with said catalyst,
- b) during the treatment, the operating conditions of the gas flow in the free reaction space are adjusted corresponding to the Froude numbers in the range of

$$1 \leq 3/4 \cdot \frac{\mu^2}{g \cdot d_k} \cdot \frac{\rho_g}{\rho_k - \rho_g} \leq 100$$

with

$$\frac{\mu^2}{g \cdot d_k} = Fr^2$$

Claim 2 (previously presented). The process as claimed in claim 1, wherein in the reactor honeycomb and/or plate catalysts (20) are used, which beside titanium dioxide and tungsten contain more than 0.5 wt-% vanadium pentoxide.

Claim 3 (previously presented). The process as claimed in claim 1, wherein said free oxides, carbonates, hydroxides of calcium, magnesium, sodium and potassium have an average particle size d_{50} of between 5 μm and 100 μm .

Claim 4 (previously presented). The process as claimed in claim 1, wherein said one or more substances are free oxides, carbonates, hydroxides of calcium.

Claim 5 (previously presented). The process as claimed in claim 1, wherein as reducing agent there are used NH_3 -releasing compounds selected from the group consisting of $(\text{NH}_4)_2\text{SO}_4$, $(\text{NH}_4)_2\text{CO}_3$, $(\text{NH}_4)\text{HCO}_3$, $(\text{COONH}_3)_2\text{H}_2\text{O}$, HCOONH_4 , NH_3 , NH_4OH , $\text{H}_2\text{O}-\text{CO}-\text{NH}_2$, NH_2CN , $\text{Ca}(\text{CN})_2$, NaOCN , $\text{C}_2\text{H}_4\text{N}_4$, $\text{C}_3\text{H}_6\text{N}_6$, NH_3 -containing waste waters from photochemical plants, and combinations thereof.

Claim 6 (previously presented). The process as claimed in claim 5, wherein before entry of the exhaust gases in the reactor, the NH_3 -releasing compounds are added to them, in gaseous, liquid or solid form and at temperatures in the range of from 200°C to 1000°C.

Claim 7 (previously presented). The process as claimed in claim 6, wherein the NH_3 -releasing compounds are added to the exhaust gas stream in the form of dilute aqueous solutions at temperatures in the range of from 300°C to 550°C .

Claim 8 (previously presented). The process as claimed in claim 1, wherein said one or more substances selected from the group consisting of free oxides, carbonates, hydroxides of calcium, magnesium, sodium and potassium are present in or added to the exhaust gas stream before the NH_3 -releasing compounds are added.

Claim 9 (previously presented). The process as claimed in claim 1, wherein said exhaust gases enter the reactor from above or from below.

Claim 10 (previously presented). The process as claimed in claim 9, wherein said exhaust gases enter the reactor alternately from above and from below.

Claim 11 (previously presented). The process as claimed in claim 1, wherein in addition to the breakdown of sulfur oxides and nitrogen oxides, the reactor is at the same time used for the breakdown of halogen compounds, halogenated organic compounds, hydrocarbons and CO .

Claim 12 (previously presented). The process as claimed in claim 1, wherein said exhaust gases are dust-laden exhaust gases generated in the chemical and metallurgical industries, in the cement and lime industries, in power plants or in garbage incineration plants and are supplied to said reactor at temperatures in the range between 200°C and 500°C without the need for additional preheating.

Claim 13 (currently amended). An apparatus for the treatment of dust- and oxygen-containing exhaust gases of a cement factory, which exhaust gases contain sulfur oxides and nitrogen oxides, comprising a reactor within which a catalyst with flow passages, in which the free opening surface of the catalyst (20) is more than 50 % and in which the passages of the catalyst (20) have a hydraulic diameter of more than 2 mm is disposed, which reactor is preceded by a cyclone heat exchanger, said reactor having a top and bottom and said apparatus having conduits to introduce said exhaust gases into said reactor from the top, from the bottom and alternately from the top and from the bottom.

Claim 14 (withdrawn). The apparatus as claimed in claim 13, adapted for the addition of reducing agents and raw meal to the cyclone heat exchanger.

Claim 15 (withdrawn). An apparatus according to claim 13 for the treatment of dust- and oxygen-containing exhaust gases of a power plant, which exhaust gases

contain sulfur oxides and nitrogen oxides as well as halogen compounds, halogenated organic compounds, hydrocarbons and CO, wherein the reactor is disposed in an exhaust gas stream behind a boiler and before an air preheater.

Claim 16 (previously presented). The process according to claim 2, wherein said solid catalyst comprises 2-8% wt vanadium pentoxide.

Claim 17 (withdrawn). The process of claim 14, wherein said apparatus is adapted for the addition of said reducing agents in the vicinity of the addition of said raw meal.

Claim 18 (withdrawn). The process of claim 13, wherein said apparatus is adapted for the addition of a reducing agent and a raw meal, wherein said raw meal is added to said cyclone heat exchanger and said reducing agent is added between said cyclone heat exchanger and said reactor.

Claim 19. (withdrawn). The process of claim 13, wherein said cyclone heat exchanger is a plurality of cyclone heat exchangers arranged in series, and said apparatus is adapted for the addition of clinker to one of said cyclone heat exchangers, and the addition of a reducing agent at a point between the reactor and the addition point of said raw meal, but before the last cyclone heat exchanger is said series, preceding the reactor.